SOLAR SUBDIVISION SURVEY REPORT

PLANNING DIVISION

CONSERVATION AND ENERGY UTILIZATION DEPARTMENT

JUNE 1979

SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT

SACRAMENTO MUNICIPAL UTILITY DISTRICT

The District was created on July 2, 1923, under the California Municipal Utility District Act by a vote of the electorate. It is the sole distributor of electric power within an area of about 657 square miles in central California, consisting of the major portion of Sacramento County (including the State Capitol, Sacramento) and a small portion of adjoining Placer County. The District has a population of approximately 707,000 and is governed by a board of five directors elected by ward for staggered four-year terms.

The District's Conservation and Energy Utilization Department was established in September 1977. The Department's mission is to reduce the need for new generating facilities and to ensure the efficient use of energy resources. Consistent with the goal of reducing the growth in energy consumption and shifting towards using a greater share of renewable resources, the Department has several activities in the solar energy field. As one of these activities, the Solar Subdivision Survey was conducted to gather more information to assist in promoting use of passive and active solar energy in the new home market.

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ABSTRACT

The subsequent report contains results from a survey of California developers experienced in building and selling residential solar subdivisions. Twenty-three developers responded to the questionnaire representing a 33 percent response rate. The developments are located throughout California: 13 in the northern portion of the state and 19 in the south.

The single and multifamily housing projects range drastically in size, both in terms of the number of units per development and average square feet per unit. Prices also vary considerably among the housing units. With units available as low as $32,000, this is evidence that solar homes can be made affordable for the median income.

Financing was generally made available through conventional loans. Some of the single family unit developments additionally offered FHA, VA, and/or CALVET approved financing, which indicates a willingness of established financial institutions to make loans available for solar homes. Furthermore, the majority of the solar housing units have been sold. Thus, the fact that the housing units include solar features, has not prevented sales.

In most instances, the survey respondents reported that buyers did not request the solar feature, however, they purchased it as a standard feature of the housing unit. In one case, a developer reported offering a solar option. Thus far, 290 (95 percent) of the homes in the development have been sold, with only one solar system purchased. Based on this experience, one might assume that consumers in general will not buy a solar energy system in a home unless it is included as a standard feature.

The majority of the housing units have active systems and feature domestic water heating (DWH). This is evidence that there is a lack of emphasis on passive design, which according to the California Energy Commission, is the most affordable solar application for new buildings.

The report further contains information on advertising methods used to reach customers; business considerations which led the developers to build solar subdivisions; the developers' concerns with selling solar homes; and descriptions of the changes (structural, solar system, and marketing) that developers would make if they were to build another subdivision.

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I. INTRODUCTION

During mid-April 1979, a survey questionnaire[1] was mailed to developers: approximately 70 located in California, and ten out of state. The survey was to gather information concerning the sales of solar subdivisions. Presumably, with the information elicited by the questionnaires, a clearer picture will result regarding the enhancement of sales of solar energy equipped residences.

Twenty-three questionnaires from California developers were returned, representing a 33 percent response rate.[2] One questionnaire was returned from out-of state, however, the question responses were incomprehensible and resultantly of no value. Information has been obtained for the subsequent number and type of subdivisions:

- Twenty-six single family unit subdivisions in California; ten located in northern California, and 16 in the southern portion of the state.
- Six multifamily unit developments in California; half in northern and half in southern California.

NOTE: Two of the above-mentioned single family unit subdivisions are located within the SMUD district service area.

Additionally, a letter was received from an Irvine-based developer, discussing the City of Cerritos' attempt to require installation of solar domestic water heating systems on one-half of the units in his proposed 40 unit single family subdivision; a requirement which the builder has elected to contest. He states his point of view in the present market as, "...we would like to wait until the true demand and acceptance by the buying public firmly exists and that all of the problems and technological advances are sucessfully met with the various systems before we commit outselves to a major program."

The subsequent analysis of the responses to the questionnaires is divided into the following categories:

- California single family unit solar subdivisions
- California multifamily unit solar developments
- Subdivisions located in the SMUD service area

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[1] See Appendix 1, sample copy of cover letter and questionnaire.

[2] Appendix 2 contains a map depicting the location of the solar developments that are represented by this survey.

II. OVERVIEW OF THE CALIFORNIA SOLAR LEGISLATIVE SCENE

State* and local government laws form a major part of the environment in which the developer operates; either limiting or enhancing his efforts. The ensuing legislative summaries illustrate the California legal environment with respect to solar energy.

A. CALIFORNIA CHAPTERED LEGISLATION

The subsequent legislative summaries represent solar-related bills that have passed the California State Legislature in recent years.

ASSEMBLY BILLS

AB1512, Fazio, September 1977

Public Resources Code

Solar energy and solar devices: thermal systems

Requires ERCDC to develop and adopt regulations governing solar energy devices, on or before November 1, 1978; develop designs and specifications for prototype housing to use passive solar systems for heating and cooling, no later than December 31, 1978; develop a design for passive and semi-passive solar systems, on or before December 31, 1979; and, allow for enforcement of standards relating to the safety and durability of the solar devices.

AB1558, Hart, September 1977

Health and Safety Code; Revenue and Taxation Code

Solar energy and antipollution facilities

Increases the existing solar energy tax credit for single family dwellings to 55 percent of the cost of purchasing and installing solar equipment or $3000, whichever is less. The credit allowed for commercial and industrial units for which the cost of the solar energy system exceeds $6000, is $3000 or 25 percent of the total costs, whichever is greater. Energy conservation measures applied in conjunction with solar energy systems to reduce the total cost or backup energy requirements of such systems shall be considered part of the systems, and shall be eligible for the tax credit. Eligible conservation measures applied in conjunction with solar space heating shall include, but not be limited to, ceiling, wall, and floor insulation above that required by law at the time of original construction. Eligible conservation measures

* Special thanks to Alan Mirviss of SUNRAE, the statewide solar lobbying group, for providing certain of the state legislative bill summaries.

applied in conjunction with solar water heating shall include, but not be limited to, water heater insulation jackets, and shower and faucet flow reducing devices. Energy conservation measures which shall be eligible for the tax credit when applied in conjunction with solar energy systems shall be defined by the Energy Resources Conservation and Development Commission as part of the solar energy system eligibility criteria.

This bill allows unused portions of the credit to be carried over to future years. (The monetary figure isn't a deduction--the amount if subtracted from the total amount of state taxes owed after all other deductions are taken into account. If the taxpayer's bill is less than the credited amount, the unused part of the credit can be carried over and utilized the next year or for however many years it takes to deplete it. The law makes solar heating systems attractive, but the system must have a three-year life span and meet certain minimum warranty standards. If the standards are not met, the taxpayer may end up footing the entire bill.)

In the event that a federal income tax credit is enacted for costs incurred by a taxpayer for the purchase and installation of solar energy systems, the state credit shall be reduced so that the combined effective credit shall not exceed 55 percent of the costs.

AB2225, Young, July 1978

Financial Code

Loans: energy devices

This law allows commercial banks and savings and loan associations to make amortized, 15-year loans or advances of credit to finance the purchase and installation of material or equipment designed to promote energy conservation. Residential property is used to secure the loan. (This law is important in that it provides a tool which interested public and private persons can use to pressure lending institutions to make more solar loans.)

10:00 p.m. 2/7/80

AB2321, Imbrecht, September 1978

Public Resources Code

Solar energy: shade control

As amended, this bill prohibits, after January 1, 1979, any tree or shrub to be placed or grown after the installation of a solar collector on another's property so as to cast a shadow over 10 percent of that collector between 10 a.m. and 2 p.m. As finally amended, vegetation planted prior to the installation of the system would be exempt. Further, any city council or county board of supervisors could vote themselves out of the provisions of this act. (The dubious provision requires a person implementing passive systems that would infringe on an adjacent active system to go to court to prove his system would provide greater net energy savings than the active system.)

AB2740, Kapiloff, August 1976

Health and Safety Code

Residential structures: solar energy

Authorizes any city or county to require that new buildings subject to the State Housing Law be constructed in a manner permitting installation of solar heating and nocturnal cooling devices, including but not limited to, a roof pitch and directional alignment suitable for retrofitting with solar energy collecting and nocturnal cooling devices.

AB2841, Mello, September 1978

Unemployment Insurance Code: Public Resources Code

Job training for low-income individuals

This law requires the Employment Development Department and the Energy Commission to make a specified study regarding energy employment needs through 1982 and to report to the Legislature by November 30, 1979. The study would involve: (1) the compilation of a list of energy-related job training programs in the state; (2) the development of information regarding on-the-job skills and needs in energy-related industries expected yearly through 1982; and (3) based on these projections, an assessment of the worth of energy-related job training programs.

AB2851, Wray, September 1978

Military and Veterans Code

Veterans' farm and home purchases: maximum amounts: Veterans' Revenue Debenture Act

This requires CalVet to exclude the value of solar heating devices in appraising the worth of a home and allow the expenditure of up to $48,000 for purchase of the home.

AB2984, Bates, September 1978

Public Utilities Code

Public utilities: solar energy systems

Would require that before any gas or electrical utility (under the jurisdiction of the Public Utilities Commission) could begin a solar manufacturing or marketing program, the PUC would have to find that the proposed program did not restrict the competition or growth of the solar industry. As amended, this includes any utility subsidiary.

AB3046, Rosenthal, September 1978

Public Resources Code

Energy: passive solar design: competition

Appropriates $315,000 from the Energy Commission Reserve Account for a statewide contest to develop the best passive solar design in each of six climate zones in California.

AB3214, Wornum, September 1978

Water Code

County Water Districts: solar energy

Allows the North Marin County Water District to sell solar equipment within its district.

AB3247, Calvo, September 1978

Public Utilities Code

Solar energy systems; loans

Requires the PUC to investigate the feasibility of using utilities and/or conventional financing institutions to provide financing for solar energy systems. The report is due by January 1, 1980. (The heart of the bill, to implement such program, was taken out by the Senate Public Utilities, Transit and Energy Committee.)

AB3250, Levine, September 1978

Civil Code, Government Code, Health and Safety Code, Revenue and Taxation Code

Solar easements

Prohibits local governments from passing ordinances which restrict or prohibit solar use. The bill allows the locals to require solar easements as a condition of approval for tentative subdivision maps. The maps shall also provide, to the extent feasible, for passive design features. Codes, covenants and restrictions in subdivisions which prohibit or restrict solar are prohibited. For the individual, it permits agreements between neighbors for receiving sunlight, with any costs applied to the 55 percent solar tax credit.

AB3324, Wornum, September 1978

Public Resources Code

Energy resources: solar energy reports

Requires the CEC to develop and transmit to the Governor and the Legislature, not later than January 1, 1980, a plan for the maximum feasible solar implementation in this state by the year 1990, and also to develop a program on the use of solar energy in this state, including various designated factors, and transmit it to the Governor and the Legislature, initially, not later than January 1, 1980, and thereafter include it in a designated commission's biennial report of the commission to the Governor and the Legislature.

AB3623, Hart, September 1978

Revenue and Taxation Code

Solar energy and antipollution facilities

Changes the maximum amount of credit which may be deducted in certain circumstances, revises provisions for the administration of the solar tax credit, and revises the definition of a solar energy system, for such purposes.

This law took effect immediately as a tax levy and will remain in effect until January 1, 1981, and at which time, it will be repealed, unless a later enacted statute deletes or extends such date.

(Essentially, this is "clean-up" legislation for the solar tax credit which makes several technical changes in the credit. Among the more important are allowing builders to pass on the credit to the home purchaser and explicitly including passive solar, wind, and photovoltaic system in the definition of eligible systems.)

ACR105, Bates, May 1978

Solar Energy: Sun Day

Declares Legislative support in the designation of May 3 as Sun Day, a day for the promotion of rapid development of solar energy.

SENATE BILLS

SB146, Alquist, June 1977

Revenue and Taxation Code

Property tax exemption

Exempts from property taxation any equipment which is attached to a residential or nonresidential building or swimming pool as part of a solar energy system. Such exemption applies only to lien dates for fiscal years commencing in 1979 to 1983, inclusive.

SB150, Alquist, September 1977

Public Resources Code

Energy systems; public buildings

Would permit governmental agencies to consider construction guidelines and cost analysis established by ERCDC in the selection of a building design.

Would prohibit any governmental agency from commencing construction on or after January 1, 1979, on any building which has more than 10,000 square feet of floor area and which has a heating, cooling, water heating or lighting system that is designed to provide lighting and space conditioning more than a 1000 hours per year, unless the structure complies with nonresidential building standards developed by the Commission. Additionally, it is required that each such new state-owned building have a supplementary solar water heating system unless specifically exempted by the State Architect for reasons of economic or physical infeasibility.

SB218, Alquist, May 1976

Revenue and Taxation Code

Personal income tax deduction; solar energy device

Permits every taxpayer to elect to deduct from personal income tax a credit of an amount equal to the lesser of 10 percent of the cost, or $1000, of the acquisition cost of any solar energy device on premises owned and controlled by the taxpayer, payment for which is made by the taxpayer during the taxable year or the income year, in lieu of any other deduction to which such taxpayer may be entitled.

SB373, Rains, January 1978

Health and Safety Code; Revenue and Taxation Code

Energy resources surcharge; pilot solar water heating loan program

Changes the date the energy resources surcharge is determined by the State Board of Equalization and applied to electric bills. It also provides for adjustments of the rate, if necessary, after approval of the Budget Act. In addition, this bill authorizes limited loans for residential installation of solar water heating and space heating equipment to owners of dwellings damaged or destroyed by state declared disasters.

SCA15, Alquist, June 1977

Senate Constitutional Amendment

Property tax exemption

Authorizes the Legislature to exempt from property taxation all or any portion of property which is used as an alternative energy system which is not based on fossil fuels or nuclear fuels.

B. CALIFORNIA BILLS INTRODUCED

The following legislative summaries represent solar-related bills introduced during the 1979 California legislative session:

ASSEMBLY BILLS

AB900, Goggin, March 15, 1979

Energy: conservation assistance loans; schools, hospitals, public care institutions, and local government

Would appropriate $200 million from the increased monies in the Tidelands Oil Fund. (Federal decontrol of oil will increase the amount the State collects in royalties for off-shore drilling.) This money would be used for loans to hospitals, schools, public care institutions and local governments for financing energy conservation projects. The projects must recover their costs through decreased energy costs.

Status: Passed to Senate.

AB1405, Hayes, March 28, 1979

California Alternative Energy Source Financing Authority

This bill would create a California Alternative Energy Source Financing Authority which would be authorized to issue revenue bonds in $200 million increments. This money would be used to finance solar, wind, biomass.

Status: Not heard in Committee.

ACA46, Hayes, April 3, 1979

Energy: alternative sources: financing of facilities

This bill would amend the State Constitution to allow the legislature to issue revenue bonds for alternative energy projects. It would have to be approved by the voters before AB 1405 could take effect.

Status: Not heard in Committee

ACR27, Mello, February 6, 1979

Constitutional Amendment

Would urge the US Department of Energy to provide support for photovoltaic research in California. Has no weight of law.

Status: Set for Assembly Resources, Land Use, and Energy Committee on July 5, 1979.

SENATE BILLS

SB16, Roberti, December 4, 1978

Energy

Sets up a State Authority to provide loans to small businesses to make 20-year low interest loans for commercial and industrial applications of solar and renewable resources. The State Treasurer would loan the Authority $2.5 million which would be used with federal loan guarantees to leverage up to $25 million.

Status: Pending on Senate Floor.

SB566, Rains, March 14, 1979

Solar water and space heating: loans: payment

Would authorize interest-bearing loans to be made from the continuously appropriated Solar-Energy Revolving Loan Fund to local agencies or nonprofit corporations operating or developing housing for persons and families of low and moderate income, limited to costs related to specified solar energy systems, and subject to specified repayment guidelines; would extend the termination date of the loan program from December 31, 1980 to December 31, 1983.

Status: Set for hearing in Assembly Resources, Land Use, and Energy Committee on July 5, 1979

SB798, Russell, March 23, 1979

Public Utilities: solar energy systems

Existing law permits the manufacture, lease, sale, or other ownership or control of solar energy systems by electrical or gas corporations subject to the jurisdiction and control of the PUC. This bill would revise requirements to specify that the PUC shall grant authorization when it finds that proposed program will not "unlawfully" restrict competition or "unreasonably" restrict growth in the industry or "unlawfully" restrict competition in the marketing of solar energy systems (essentially adds the words in quotes).

This bill also would delete the requirements that before granting authorization, the PUC shall find that the proposed program will accelerate solar energy development and use and that the PUC shall suspend or terminate authorization whenever it finds that these conditions are not being met. (Would substantially weaken the "anti-monopoly" prohibition on utility marketing of solar systems [the so-called Bates bill] .)

Status: Set for Assembly Resources, Land Use, and Energy Committee on July 10, 1979.

SB946, Sieroty, March 27, 1979

Energy: swimming pools: solar energy systems

This bill would prohibit the issuance of a permit for a swimming pool with a heating system built on a residential site after July 1, 1980, unless the heating system included a solar energy system which would provide at least 50 percent of the energy requirements from May 1 to October 1.

The bill would authorize exemptions under specified conditions; require the CEC to prepare a manual not later than April 1, 1980, for local building officials issuing permits or granting exemptions under the bill.

The bill would appropriate an unspecified amount for allocation and disbursement to local agencies to reimburse them for costs incurred.

Status: Died in Senate Energy and Public Utility Committee.

SB995, Alquist, March 29, 1979

Solar Energy

Expands limits of the 55 percent tax credit for the acquisition cost of a solar energy system. Would include monthly payments for solar energy systems as a cost of such systems and would provide that taxpayers who partially own and partially lease a solar energy system from a public utility shall receive a credit equal to 55 percent of the purchased portion of such system and the principal recovery portion of the lease payments. Would take effect immediately as a tax levy and would remain in effect until January 1, 1981. (As recently amended, this bill is in potential conflict with the "Bates bill.")

Status: Pending on Senate floor.

SB1205, Roberti, May 3, 1979

California Energy Development Authority; energy conservation and alternative energy production and development

Would appropriate $150 million from the Tideland Oil Fund to establish an Authority which would make loans to banks and utilities. They, in turn, would make loans to consumers, businesses and industry to install solar systems. Would presently allow utility solar leasing programs, although this is promised to be changed.

Status: Pending hearing in Senate Energy and Public Utilities in early July.

SB1206, Roberti and Alquist, May 3, 1979

Energy development finance bonds

Would place a $500 million bond act on the 1980 ballot for financing the Authority established in SB 1205.

Status: Pending hearing in Senate Energy and Public Utilities.

C. LOCAL GOVERNMENT ORDINANCES AND ACTIONS

California local governments are very progressive in promoting the use of solar energy. This is highly significant in view of the fact that local governments play a major deciding role in land use decisions.

The subsequent examples demonstrate the leadership role that California local governments have taken to promote the use of solar energy systems.

By unanimous vote, San Diego County became the first jurisdiction in the nation to pass a solar water heating ordinance. Effective October 1, 1979, the ordinance requires the use of solar energy in new homes in two phases. Phase one requires solar domestic water heaters to be installed in new housing areas where no natural gas is available. Phase two will occur after a year. If the relative costs of different energy sources remain status quo, all new housing will be required to install solar water heaters.[3]

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[3] Sacramento Bee, "A 'First' for Solar Energy," January 27, 1979

Additionally, San Diego County's Board of Supervisors passed a motion on February 27, 1979 to give solarized developments with both passive and active systems, priority processing status. According to the regulation, "If solarized developments receive 'last in, first out' priority, those projects would then be processed first at each step in the process, notwithstanding the size of the backlog or the length of time other projects have been waiting for action."[4] Priority processing will cease October 1, 1980; at such time when all new subdivisions may be required to have solar systems.

During December 1978, the City Council of Cerritos, by action, set the requirement that all new subdivisions shall install solar domestic hot water systems in 50 percent of the homes. As of June 28, 1979, the requirement has been imposed on three subdivisions representing 92 homes, of which 47 will be solar.[5]

III. ANALYSIS OF QUESTIONNAIRE RESPONSES

A. CALIFORNIA SINGLE FAMILY UNIT SOLAR SUBDIVISIONS

1. Geographic Location--There are 26 single family unit subdivisions: one each located in Citrus Heights, Hemet, Irvine, Monterey, Newport Beach, Pico Rivera, Rancho Mirage, Riverside, Roseville, Sacramento, and Santa Ana; two each in Davis, Fresno, and San Jose; and nine in San Diego. Of the nine in San Diego, five were built by a single firm, Time for Living.

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[4]Western Sun, Capturing the Sun's Energy: Opportunities for Local Governments, California Office, Sacramento, June 1979

[5]Information obtained through phone conversation with Gil Avellar, Planner, City of Cerritos, June 28, 1979

2. Number of Homes--The sizes of the subdivisions range from as few as nine homes to as many as 317. The following categories were devised to provide a general view of the number of homes per subdivision. The majority of subdivisions fall into the size range of 100 and less.

Number of Homes Per Subdivision	Number of Subdivisions
50 or less	11
51 - 100	3
101 - 150	6
151 - 200	1
201 - 250	2
251 - 300	1
301 - 350	2

3. Year Built--The subsequent chart exhibits the range of years in which solar subdivisions have been built. The earliest subdivisions commenced in the beginning of the 1970's, and a few are still under construction. The majority were built during the period of 1977 to 1979.

Range of Years	Locations
1972 - 77	Citrus Heights, Roseville
1975 - 79	Davis
1976 - 77	Hemet, San Diego
1977 - 78	Riverside, San Diego (2)*
1978	Pico Rivera
1978 - 79	Fresno (2), Irvine, Newport Beach, Sacramento, San Diego (5), Santa Ana
1979	Rancho Mirage, San Jose
1979 - 80	Monterey
Under construction	Davis, San Diego, San Jose

*Assume the number of subdivisions in a geographic location listed within a category to be one, unless specified by a number in parentheses. This notation will be used throughout the remainder of this report.

4. Solar or Solar Option--Nineteen of the divisions include the solar features as a part of the home; whereas, three other subdivisions offer a solar option.

   A large 305-unit development in Sacramento offers the solar option. To date, 290 (95 percent) of the homes have been sold with only one solar domestic hot water system installed.

   Two additional large developments offer an optional domestic hot water system. They are located in Irvine and San Jose; and consist of 173 and 255 single family units, respectively. The Irvine development is being constructed in four phases; to date two phases have beem completed. Phase one has 42 homes, of which, 17 (41 percent) solar options have been purchased; phase two has 37 homes and 14 (38 percent) solar options have been purchased. The San Jose development is slated to begin construction August 1979, thus, none of the homes have been sold.

   Portions of three additional subdivisions include solar homes. A 140-unit subdivision in Davis will be 90 percent solar upon completion. In Newport Beach, 10 percent of a 76-unit development is solar. And, in Rancho Mirage, a 22-unit subdivision has six solar homes; the remaining 16 offer the solar option.

   Additionally, one of the San Diego developments, with 54 units, only offers solar-heated pools.

5. Price Range--The overall range of prices is between $32,000 and $200,000. Due to a wide variance in prices, the subsequent categories have been devised to depict prices of solar homes within specific geographic locations.

   NOTE: A subdivision may be listed in more than one category.

Price Range	Location
$ 30,000 - 50,999	Citrus Heights, Davis (2), Hemet, Roseville, San Diego
51,000 - 70,999	Citrus Heights, Davis (2), Fresno, Hemet, Newport Beach, Roseville, San Diego
71,000 - 90,999	Citrus Heights, Davis (2), Fresno, Pico Rivera, Riverside, Roseville, San Diego (5), San Jose
91,000 - 110,999	Davis, Pico Rivera, Riverside, San Diego (4), San Jose (2), Santa Ana
111,000 PLUS	Monterey, Newport Beach, Rancho Mirage, San Diego (2), San Jose, Santa Ana

6. Financing Methods--Some developers have made more than one method of financing available to home buyers. Developers representing 20 subdivisions indicated they had conventional financing; whereas, eight offered FHA, six had VA, and one had CALVET.

7. Average Square Feet Per Unit--The following table depicts the number of developments by geographical location that fall within a size range, or portion thereof, based on average square feet per housing unit.

Average Square Feet	Location
1200 - 1400	Hemet, Monterey, Newport Beach, San Diego, San Jose
1401 - 1600	Citrus Heights, Monterey, Pico Rivera, Roseville, San Diego (5), San Jose
1601 - 1800	Citrus Heights, Fresno (2), Roseville
1801 - 2000	Riverside, Sacramento, San Diego
2001 - 2200	San Diego, Irvine
2201 - 2400	San Diego, Santa Ana

8. Percentage of Homes Sold--The majority of solar homes have sold. The following table exhibits the percentage of homes sold in 19 of the 26 subdivision. Additionally, the table shows the total number of homes in the subdivisions, as well as the number of homes sold within each percent sold category.

	Percentage of Homes Sold In Subdivisions								
	100	97	95	91	86	72	71	19	16
Number of Subdivisions	11	1	1	1	1	1	1	1	1
Number of Homes In Subdivisions	937	32	305	23	44	111	105	119	76
Number of Homes Sold	937	31	290	21	38	80	75	22	12

Of the 1752 homes represented in this table, 1506 or 86 percent have been sold.

The remainder of the subdivisions not represented in the table are either partially, or not yet constructed; or sales have not yet commenced. These six subdivisions will equal 982 homes when completed.

9. Solar Features--The following is a list of available solar features in subdivisions by geographic location. Domestic solar water heating is featured in a vast majority (77 percent) of the subdivisions.

Solar Feature	Location
Space Heating / DWH and Cooling	Davis (2), Monterey, Rancho Mirage
Space Heating/DWH	Hemet
DWH	Citrus Heights, Fresno (2), Irvine, Newport Beach, Pico Rivera, Riverside, Roseville, Sacramento, San Diego (8), San Jose, Santa Ana
Pool Heating	San Diego

10. Solar System Type--The solar energy systems are either active, passive, or hybrid; the majority are active. One subdivision contains homes that are exclusively passive. This subdivision is Village Homes, located in Davis; it has 11 different types of solar energy systems of which 75 percent are passive, 20 percent hybrid, and five percent active.

The following table indicates the type of solar system utilized in subdivisions by geographic location.

Solar System Type	Location
Active	Davis, Fresno (2), Hemet, Irvine, Newport Beach, Pico Rivera, Rancho Mirage, Sacramento, San Diego (9), San Jose (2), Santa Ana
Passive	Davis
Hybrid	Citrus Heights, Davis (2), Monterey, Riverside, Roseville

11. Business Considerations Which Led to Building a Solar Subdivision

MARKETABILITY:

- Time for Living in San Diego has built five solar subdivisions (all active solar domestic water heating systems), and feels that the solar feature makes the homes more marketable.
- Two other developers feel that solar is a viable feature.
- Another developer believes there is an increasing public acceptance of solar.
- Two developers built solar subdivisions on an experimental basis to test for market acceptance.
- One developer decided to build a solar subdivision as he felt it would be a selling point, and wanted an advantage over competition.

FINANCIAL SAVINGS:

- Five developers mentioned a desire to offer an alternative energy source in an attempt to reduce home maintenance and operation costs in view of the energy crisis.

- One developer offered solar domestic water heating because his subdivision is located in an all-electric area. (Typically, electricity is more expensive than natural gas when used for domestic water heating.)

- Two mentioned the California solar tax credit.

- One developer stated that cost effectiveness due to the moderate price of devices led him to build a solar subdivision.

CONSERVATION:

- One developer feels that future energy shortages are predictable and is seeking energy independence.

- Another stated that business must take on social responsibilities, particularly in view of the current energy situation.

- A third developer commented that he wanted to prove that solar is both feasible and viable, and can be utilized in lieu of nonrenewable resources.

- Another mentioned that he has an interest in conservation, and especially in solar technology.

PAST EXPERIENCE:

- One developer had experience with installations of solar systems on other projects.

- Another has been in the development business for 20 years; six years ago, he began constructing energy efficient homes; therefore, solar was a logical progression for his firm.

- One developer has been active in state solar activities.

12. Advertising Methods Used to Reach Customers--The subsequent advertising methods were used by the developers. The numeric notation represents the number of developers indicating use of a particular method. Some used more than one method.

Newspaper	- 16	Radio	- 1
Model Home	- 5	Brochure	- 1
Magazine	- 4	Free Publicity	- 3
TV	- 1	None	- 2

13. Concerns with Selling Solar--

NO CONCERNS:

Nine developers responded that they had no concerns in selling solar homes. The developer from Hemet said that the public is interested. The developer of Time for Living, with five solar subdivisions in San Diego, stated that there is no difficulty in selling solar-equipped homes.

COST CONCERNS:

- One developer said that the tax credit is only good for two more years, and buyers are afraid they will not be able to use it all. *(This is a misconception. Once a consumer claims the California solar tax credit, the unused credit may be carried over to following years, until the full credit due is received.)*

- Another developer stated that solar installations are not cost effective which leads to buyer resistance.

- Two developers are concerned with recovering costs in the sales price.

- Two other are concerned with the initial selling price of the homes resulting from the addition of the passive and active solar systems.

- One developer stated concern over the true cost of heating water.

- Another was concerned with savings to buyers.

ENERGY CONCERNS:

- One developer feels that Washington, DC is still issuing confusing and conflicting energy statements, making solar sales more difficult.
- Another stated that the public feels the energy shortage is a secret plot by the oil companies.
- A third developer is concerned with the conservation of nonrenewable sources.

SOLAR HARDWARE CONCERNS:

- Two developers have grave doubts about solar hardware durability.
- Another feels more energy is wasted creating the solar hardware than will be saved by its use.

CONSUMER EDUCATION:

- One developer stated concern with the familiarization of the end user with the solar system and its organization.
- Another is concerned with the idea of educating the public and making them aware of the pros and cons.
- A third developer stated that too little is known about tax credits.

14. Would the Developers Build Another Solar Subdivision?

Seventeen developers stated they would build another solar subdivision. Seven responded negatively; they are located in: Citrus Heights, Irvine, Pico Rivera, Rancho Mirage, Roseville, Sacramento, and San Diego. One additional developer from Santa Ana was not sure, but he was positively inclined.

15. If They Were to Build Another Solar Subdivision, What Would the Developers do Differently?

Time for Living (with five subdivisiosn in San Diego) would not make any changes. The developer from Riverside would not make any major changes. Eight developers did not respond--of which, three never plan to build a solar subdivision again. The remaining developers made the following comments:

- Employ more ridge roofs and fewer mansards
- Would put composition on the roof before installing solar equipment.
- Would not change building design, but would change the design of the active solar system: (1) would place the collector panels flush with the roof so they would not be visible--they would have the appearance of skylights, (2) would place all equipment, e.g., heat pumps, water storage tanks, etc., in one area outside the home--this is less expensive.
- Would probably utilize a closed system; minerals in the water in San Diego cause lime build up in three years which results in efficiency loss.
- Stay with breadbox and thermosiphon systems; no more pump systems, too many problems.
- The most difficulty has been in determining the system (active) and the reliability of the subcontractor.
- Would not try to push solar to the extent that they did in the beginning; feel that solar should not be stressed, rather it should be a part of the home.
- Make sure the state will back the tax credit for a longer period of time.
- Push to make the solar space conditioning system handle 80 to 85 percent of the total home load.

16. Did Many Buyers Ask for Solar Features?

YES: Irvine (Phase I—50 percent)
(Phase II—25 percent)
Monterey, Riverside, San Diego (Time for Living, five subdivisions)

NO: Citrus Heights, Fresno (2), Newport Beach, Pico Rivera, Roseville, Sacramento, San Diego (3), San Jose

OTHER: Hemet--buyers asked about the solar feature since it is included in the home package and is not offered as an option.

B. CALIFORNIA MULTIFAMILY UNIT SOLAR DEVELOPMENTS

1. Geographic Location and Number of Units

Costa Mesa - 82
Lakewood - 12, five-unit apartment buildings
2, six-unit apartment buildings
Palo Alto - 10
Salinas - 100
San Pablo - 40 (Redevelopment project built in conjunction with the City of San Pablo.)

2. Year Built--The condominiums and apartments were built between 1977 and 1979. The Salinas and San Pablo developments are not yet built.

3. Solar or Solar Option--All units are solar; no options offered.

4. Price Range--Below is a list of price ranges by development.

Price Range/Unit	Location
$ 47,400 - 49,170	Lakewood (cost to build apartments
62,500 - 72,500	Salinas, San Pablo
75,000 - 125,000	Costa Mesa
95,000 - 140,000	Palo Alto

5. Financing Methods--All developers employed conventional financing, except the redevelopment project receiving funding vis a vis SB99, municipal bond insurance. The issuance of bonds reduces the interest rate on the mortgage to approximately 7-3/4 percent; additionally, the buyer is able to qualify for a larger loan. The Lakewood units are rentals.

6. Average Square Feet Per Unit--

Square Feet/Unit	Location
840	San Pablo
900	Lakewood
1028	Salinas
1300	Palo Alto
1600 - 1650	Costa Mesa

7. Percentage of Condominiums Sold--

	100 Percent
Number of Developments	2
Number of Condominiums in Subdivisions	92
Number of Condominiums Sold	92

Two developments are not yet built; upon completion, they will consist of 140 condominiums.

There are 72 rental apartment units located in Lakewood.

8. Solar Features--

Solar Feature	Location
Space Heating / DWH and Cooling	Salinas, San Pablo
Space Heating/DWH	Palo Alto, Lakewood
DWH/Solar Heated Pool	Costa Mesa

9. Solar System Type--

Active - Costa Mesa, Lakewood

Hybrid - Palo Alto, Salinas, San Pablo

10. Business Considerations Which Led to Building a Solar Development

- Past experience: has been a developer for 20 years, started constructing energy efficient homes six years ago; therefore, solar was a logical progression.
- Experimental basis, wanted to see if it would work ("it does").
- Trial basis, but customers did not seem impressed that buildings were solar assisted.
- Feels government has done "nothing to intelligently promote accurate information" in the area of solar energy.
- Social acceptance by City Council and the California Coastal Commission.
- Energy savings.

11. Advertising Methods Used to Reach Customers

Newspaper - 2 (one developer received adequate free coverage)
TV - 1
Radio - 1
"PR" - 1

12. Concerns in Selling Solar--

- Familiarization of the end user with the unit and its operation.
- Failure of the government to provide support.
- None, even though very few people buy because of solar features.
- Inexperience of developer: installers led to numerous callbacks, costs exceeded initial budget.

13. Would the Developers Build Another Solar Development?

All responded affirmatively, except for the Lakewood developer. He stated he would not build another solar apartment building at this time.

14. If They Were to Build Another Solar Development, What Would the Developers do Differently?

- Utilize flat panels, and probably preplumb for solar with optional package for solar domestic water heating.
- Upgrade system to current technology and state of the art, as the developer now perceives it.

15. Did Many Buyers Ask for Solar Features?

NO: Costa Mesa (minority did request solar, 15 to 20 percent)

YES: All others

C. DEVELOPMENTS LOCATED IN THE SMUD SERVICE AREA

Two solar developments are located within the SMUD service area; and they both consist of single-family units. The developments are Villa Del Sol (located off San Juan Avenue in Citrus Heights) and Park River Estates (located in the South Pocket Area). Both developers responded that many buyers did not request solar features, and neither developer plans to build another solar subdivision. The following offers a brief description of each development:

1. Villa Del Sol: Built between 1972 and 1977, includes 32 solar homes priced between $32,000 and $84,000; and are on the average of 1400 to 2000 square feet. All homes have been sold and financed conventionally. The homes feature domestic water heating and a hybrid solar system. The developer's business considerations which led to this development were twofold: (1) a trip to Spain, where he became aware of solar orientation; and (2) the subdivision is all electric.

2. Park River Estates: Built between 1978-79, includes 305 solar option homes, priced between $75,000 and $95,000; homes average 2000 square feet. Two hundred ninety (95 percent) have sold via conventional financing. They feature domestic water heating and active solar systems. The developer has past experience with solar projects and desired to provide buyers with an alternate energy source. The developer mentioned that solar installations, from his perspective, are not cost effective, which leads to buyer resistance. Of the total sales to date, only one solar installation option has been sold.

IV. SUMMARY AND CONCLUSIONS

This survey represents 23 developers who responded to the questionnaire; some developers have built more than one development. These developments are located throughout California; 13 in the northern portion of the state and 19 in the south.

The bulk of the construction occurred during 1977 and 1978; however, construction began as early as 1972 for the single-family units represented in this survey. For the multifamily units represented, construction began in 1977. Construction on a couple of the complexes has not yet begun.

The single and multifamily unit housing projects range drastically in size, both in terms of the number of units per development and average square feet per unit. The number of units in the single-family unit developments range from nine to 317. The multifamily units (condominiums) range from ten to 100 units. Additionally, there are 14 apartment buildings ranging from five to six units each. As for the average square feet per unit, the single-family dwellings range from 1200 to 2400 square feet; the multifamily units range from 840 to 1650 square feet.

Prices vary considerably among the housing units. Single-family unit prices range between $32,000 and $200,000. Condominiums sell between $62,500 and $140,000. Solar homes built in Hemet by Blue Sky Radiant Homes between 1976 and 1977, sold for $35,900 to $51,900. The homes featured active space heating and domestic water heating systems. Additionally, homes built in Citrus Heights and Roseville between 1972 and 1977, sold for $32,000 to $84,000, featuring solar domestic water heating systems. This is evidence that solar homes can be built that are affordable for the median income.

Financing was generally made available through conventional loans. Some of the single family unit developments additionally offered FHA, VA, and/or CALVET approved financing, which indicates a willingness of established financial institutions to make loans available for solar homes.

The majority of the housing units have been sold. Eighty-six percent (1506) of the single-family units are sold. One hundred percent (92) of the condominiums built are sold; 140 other condominiums are still under construction. Likewise, in Lakewood, 14 apartment buildings constructed in 1978, totaling 72 units, have also been sold. Thus, the fact that the housing units include solar features has not prevented sales.

The majority of single family unit developments and all of the multifamily unit projects included solar features as a standard item with the sales of the housing unit. Three subdivisions located in Irvine, Sacramento, and San Jose offered solar as an option.

In most instances, the survey respondents reported that buyers did not request the solar feature. However, the buyers may have made inquiries regarding the solar feature when it was included in the sales price of the housing unit.

Sales statistics from two single family unit developments which offered the solar option for all of their housing units demonstrates that consumers are reluctant to purchase a solar energy system in a home unless it is included as a standard feature. In Sacramento, a 305-unit development with 290 (95 percent) of the units sold, installed only one solar energy system. In Irvine, of 79 completed homes in a projected 173-unit development, 31 (39 percent) of the solar options have been purchased.

Furthermore, a 22 unit single family development in Rancho Mirage offered six solar homes, and 16 energy efficient homes with a solar option. The solar homes included active solar space heating and cooling, and solar domestic water heating systems. Through experience, the developer has found the utility bills to be lower in the energy efficient homes; therefore, solar equipment will not be installed in the homes provided with the option.

As a result of legislation, on some instances consumers will be purchasing more residential solar systems. San Diego County leads the nation as the first jurisdiction to require the use of solar energy in new homes. The new ordinance will go into effect October 1, 1979. It consists of two phases: (1) solar domestic water heaters will be installed in new housing in areas where no natural gas is available; and (2) after a year, if the relative costs of different energy sources remain *status quo*, all new housing will be required to install solar water heaters.[6]

Additionally, during December 1978, the City of Cerritos passed a requirement that 50 percent of the homes in all new subdivisions must include solar domestic water heating systems.

The solar features offered with the single-family units include these subsequent combinations: space heating and cooling/DWH; space heating/DWH; DWH; and pool heating. The majority of the single-family units include the solar DWH feature. The condominiums that have been built feature solar DWH and solar space heating or a solar-heated pool. The condominiums under construction include solar space heating and cooling and DWH. The apartments feature solar space heating and DWH.

The types of solar systems incorporated into the housing units are active, passive, or hybrid. The majority of the single-family units have active systems; only one subdivision includes purely passive designed homes; and a few subdivisions have homes with hybrid systems. The multifamily units are divided between active and hybrid systems. This is evidence that there is a lack of emphasis on passive design.

According to the California Energy Commission, "...direct solar applications are the most affordable" for new buildings.[7] [8]The second most affordable solar application is water heating.[8] The cost effectiveness ratio of solar water heating systems and the fact that we are a "gadget-loving society" accounts for the high incidence of active solar systems in California solar housing developments.[9] In the days ahead, as consumers and developers become more knowledgeable in regard to solar applications, there should be a move in the passive direction.

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[6]Sacramento Bee, *op cit.*

[7]California Energy Commission, Solar Energy Office, "California Solar Information Packet," August 1978, p. 4

[8]*Ibid.*

[9]Furthermore, the California Energy Commission reports in the November 1978 issue of "Energy Watch," p. 63, that "there are more than 35,000 solar installations in California...Most of these units are for heating pools (21,000 units) and domestic water heating (12,000 units)."

The advertising methods used by developers to reach customers were varied, but the majority used the newspapers. A few used model homes; still fewer used magazine advertisements, TV and radio spots, and advertising brochures. A few received free publicity. For instance, Village Homes of Davis received a tremendous amount of media coverage when First Lady Rosalyn Carter visited this year. A few others claimed to have used no formal advertisement methods; news of their solar developments spread by word-of-mouth. For the major part, the methods used by solar developers did not differ from traditional practices with the exception of free publicity.

Developers may receive indirect assistance with their solar promotion efforts if Assemblyman Levine's Bill 1333 (introduced March 26, 1979) becomes law. This bill would authorize the creation of an alternative energy resources promotion board with the responsibility of the prompt and efficient development of alternative energy sources, including solar.

State and federal solar tax credits are significant marketing tools for solar developers. But it is apparent that more consumer education is necessary both in terms of informing the public with respect to the capabilities of solar energy systems; and, the availability and scope of the tax credits.

A different solar marketing position offered from the experience of one developer, is that the solar aspects of a housing unit should not be stressed--rather they should be sold as regular features of the home.

The business considerations which led the developers to build a solar subdivision include the following:

- Reduction of home maintenance costs
- Energy conservation
- Public acceptance
- Experimental purposes
- California solar tax credit
- Subdivision located in all electric area
- Philosophy that business must take social responsibilities

- Past experience with other solar projects
- Increased marketability of homes (this particular response was given by Time for Living, which has five solar subdivisions in San Diego)

The developers' concerns with selling solar homes were varied. Several developers expressed no concerns. The following is a list of concerns mentioned by the remainder of the developers:

- Expiration of California solar tax credit
- Cost effectiveness of solar systems
- Recovering costs in the sale price of the home
- High initial selling price of the home due to solar installation
- White House's "wishy-washy" stand on energy policy
- Public attitudes towards the energy crisis
- Conservation of nonrenewable resources
- Solar hardware durability
- Consumer education with regards to the operation and maintenance of systems, and the availability of tax credits
- Failure of government to provide support

The majority of developers stated that if they were to build another subdivision it would include solar features. Some of the developers mentioned structural, solar system, and marketing changes would be made. However, Time for Living said they would make no changes. Apparently, with the experience of five subdivisions, they have perfected their technique.

The developers not planning to build another solar subdivision typically have built solar developments that offer the solar option, have systems that are not cost effective, and/or have dealt with consumers who are not energy conscious. The homes in these developments range from $32,000 to $200,000 and include solar domestic water heating systems; with the exception of one development that only offers solar-heated pools.

APPENDIX 1

SAMPLE COVER LETTER AND QUESTIONNAIRE

SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT □ 6201 S Street, Box 15830, Sacramento, California 95813; (916) 452-3211

April 13, 1979

Gentlemen:

Currently, the Conservation Department of the Sacramento Municipal Utility District (SMUD) is very concerned with the use of solar energy as an alternative energy form. Specifically, we are now seeking information regarding the sales of solar subdivisions. Since very little research has taken place to date on this subject, we would appreciate your cooperation in completing and returning the enclosed questionnaire.

We hope that with the information from the questionnaire, a clearer picture will result regarding the enhancement of sales of solar energy residences, particularly for California communities.

Please return the enclosed questionnaire in the self-addressed, stamped envelope which we have provided for your convenience.

Thank you very much for your time and consideration. It is greatly appreciated.

Sincerely,

Tricia Hutchcraft
Conservation Planning Division

TH/ld

Encl.

P.S. If you have any additional information (e.g. informational brochures, printed matter, photographs, etc.) concerning your solar subdivision(s), please send to:

Tricia Hutchcraft
Conservation Planning Division
SMUD
P.O. Box 15830
Sacramento, CA 95813

SINGLE FAMILY ☐

MULTIFAMILY ☐

NAME OF SUBDIVISION _____

LOCATION _____

_____

CONTACT PERSON: _____
(NAME) (ADDRESS)

_____ _____
(PHONE) (CITY) (ZIP)

---

1. NUMBER OF HOMES IN SUBDIVISION _____

2. YEAR BUILT _____

3. SOLAR _____ OR SOLAR OPTION _____

4. PRICE RANGE: $_____ TO $_____

5. HOW FINANCED _____

6. AVERAGE SQUARE FOOTAGE _____

7. NUMBER SOLD _____

8. WHAT ARE THE SOLAR FEATURES? SPACE HEATING _____ DOMESTIC HOT WATER _____
SPACE COOLING _____ SOLAR HEATED POOL _____

9. ARE THE SOLAR SYSTEMS ACTIVE? _____ PASSIVE? _____

10. WHAT BUSINESS CONSIDERATIONS LED YOU TO BUILD A SOLAR SUBDIVISION? _____

_____

_____

_____

11. WHAT ADVERTISING METHODS DID YOU USE TO REACH YOUR CUSTOMERS? _____

_____

_____

12. WHAT ARE YOUR CONCERNS IN SELLING SOLAR HOMES? _____

_____

_____

13. WOULD YOU BUILD ANOTHER SOLAR SUBDIVISION? YES _____ NO _____

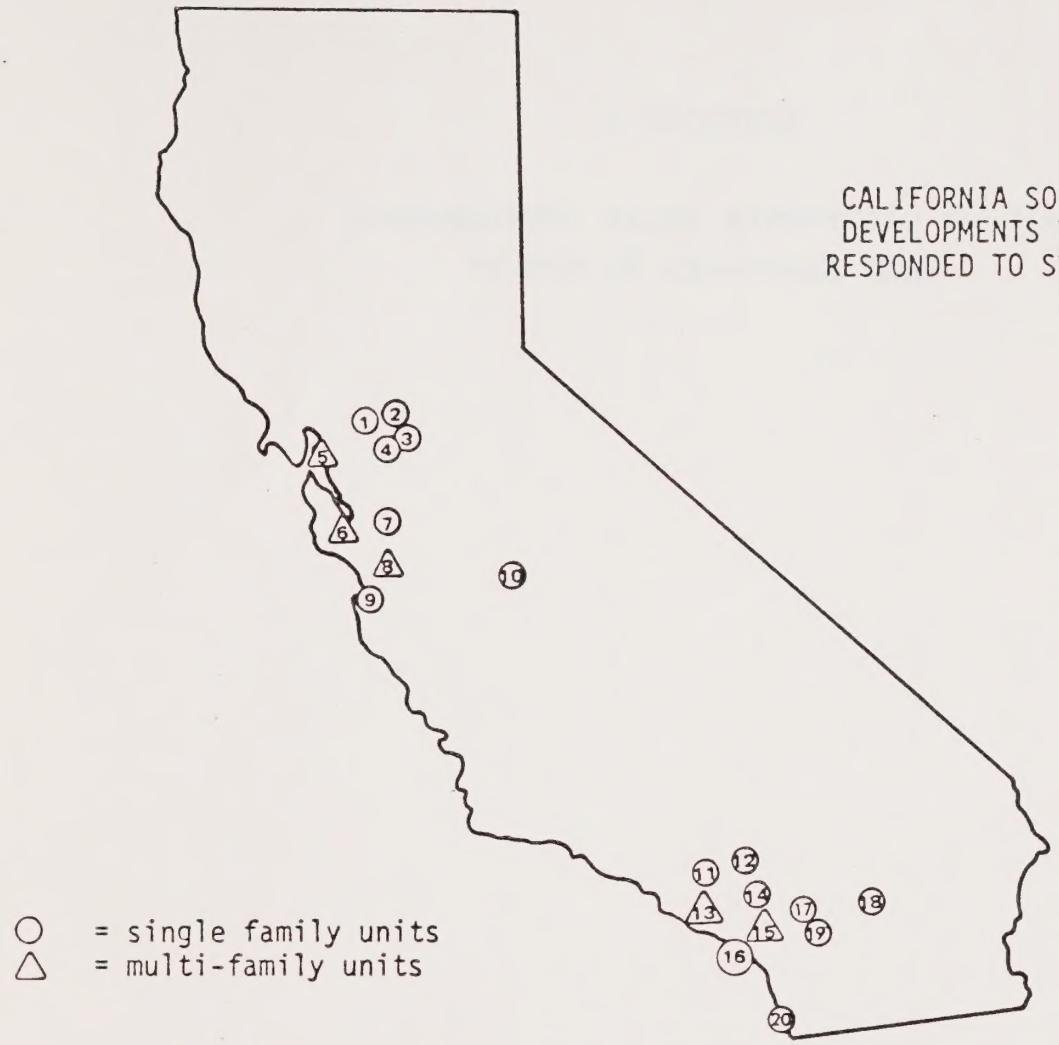
14. IF YOU WERE TO BUILD ANOTHER SOLAR SUBDIVISION, WHAT WOULD YOU DO DIFFERENTLY? _____

_____

_____

15. DID MANY BUYERS ASK FOR SOLAR FEATURES? YES _____ NO _____

_____



LOCATION, SUBDIVISION NAME, and MAP KEY

SINGLE FAMILY UNITS:

Citrus Heights, Villa Del Sol.....3
Davis, Tandem Properties.....1
Village Homes.....1
Fresno, Van Dyck Estates
1 and 2.....10
Hemet, Blue Skies Radiant Homes....19
Irvine, Woodbridge Gables.....14
Monterey, Casa del Sol 1.....9
Newport Beach, Vintage Series.....16
Pico Rivera, Rio Vista Estates.....11
Rancho Mirage, Poncherosa of
Tamarisk.....18
Riverside, The Country Place.....17
Roseville, Hunting Creek II.....2
Sacramento, Park River Estates.....4
San Diego, Avocado Highlands.....20
Cardiff by the Sea.....20
Carefree South.....20
San Diego (continued)
Dorado II.....20
Mira Mesa.....20
Santee.....20
Sonata.....20
University Heights.....20
Windsong.....20
San Jose, Jackson Square.....7
Norwood Creek.....7
Upland, Solar Crest Homes.....12

MULTI-FAMILY UNITS:

Costa Mesa, Seabluff Canyon Townhomes.....15
Lakewood, Lakewood Apts. 12-5 unit bldgs.....13
2-6 unit bldgs.....13
Palo Alto, Hizashi.....6
Salinas, Cas Del Sol 2.....8
San Pablo, Casa Del Sol 3.....5

APPENDIX 2

MAP OF CALIFORNIA SOLAR DEVELOPMENTS THAT RESPONDED TO SURVEY